Platte River Basin-10240012

Basin Description

This basin includes the entire Platte River basin except for the 102 River and its tributaries. The most upstream portions of the Platte River basin lie in southern Iowa. The river flows almost due south to its confluence with the Missouri River 15 miles northwest Kansas City. The Missouri portion of the basin has an area of 1,268 square miles. The largest tributaries are Little Platte River, Third Fork and Long Branch. The largest reservoir in the basin is Smithville Reservoir, an impounded section of the Little Platte River, with a surface area of 7,190 acres.

Average annual rainfall is 34 inches in the northern part of the basin and 38 inches in the south. Stream flow statistics for the basin are shown in Table 1.

Table 1. Stream Flow Statistics for the Platte River Basin

Stream/Location	Wtrshed. Area (sq.mi.)	Period Of Record	Flow (cfs)				
			90th Percentile *	Mean	Median **	10th Percentile ***	7Q10 Low Flow+
Platte River nr. Agency	1,760	1924-30 1932-2004	2,100	976	195	24	1.0
L. Platte R. nr. Plattsburg	65.4	1999-2004	13	18.7	1.1	0	
L. Platte R. at Smithville	234	1965-2004	513	166	18	7.8	0.0
Platte R. at Sharps Station	2,380	1978-2004	4,180	1,721	568	61	
Platte R. at Ravenwood	486	1921-25 1928-32 1958-71					0.1
Long Branch nr Guilford		1942,43,46 1962-64					0.0
Platte River at Whitesville		1964,65,67 1969-70					0.3
Castile Creek nr. Gower		1942,43,46 1962-64					0.0
Jenkins Branch at Gower		1952-72					0.0
Castile Creek nr Edgerton		1962-65,67					0.0
Little Platte R. nr Trimble		1962-64					0.0
Platte River at Platte City		1962-65 1967-71					2.0

*Flow is less than this amount 90 percent of the time
**Flow is less than this amount 50 percent of the time
***Flow is less than this amount 10 percent of the time
+ The lowest average seven consecutive day flow that occurs with a recurrence interval of 10 years.

The Platte River basin lies with the Dissected Till Plains physiographic province. The land is a mixture of hills and plains. Forty-three percent of the land is row crop, 42 percent is pasture and hayfields, 12 percent is forest, two percent water and wetlands and one percent urban.

Except for limited areas where streams may have incised Pennsylvanian aged rock, the surface of the basin is glacial till overlain by loess. Glacial till is a mostly unsorted mixture of clay, sand, gravel and rock debris created and pushed southward into Missouri by the great glacial ice sheets. Loess is a windblown silt deposit. Depth of the till is highly variable but is generally less than 200 feet. Loess deposits are generally 10-20 feet in depth. Cyclical (repetitive) deposits of sandstone, siltstone, shale, limestone and coal of Pennsylvanian age underlie these glacial deposits. In northwestern Missouri, these bedrock deposits become thicker, often as much as 1,200 feet, due to a surface depression in Pennsylvanian deposits called the Forest City basin.

The presence of the clayey till and the underlying shale and coal beds ensure that there is very little movement of water to the subsurface. Most water movement in the basin is through the surface stream network. Water that reaches the subsurface will resurface locally when a stream valley incises a confining aquatard (an impermeable layer). There are 17 small springs known in the basin, but none are known to sustain flow during dry weather. Since very little water infiltrates to the subsurface, streamflow can be very high during wet weather. For the same reason, base flows, streamflow sustained only by the re-emergence of groundwater into the stream, are very low during the intervening dry periods.

Water Quality Concerns

Acceptable water quality is defined by Missouri's Water Quality Standards [http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-7a.pdf] . Streams or lakes that do not meet these standards are considered "impaired." They may not be fit for certain uses such as swimming, drinking water supply or protection of fish and other aquatic life. Waters are considered to be "affected" rather than "impaired" if water quality changes are less serious and state standards are not exceeded. These standards also list more than 3,600 classified streams and more than 400 classified lakes in the state. A classified stream is one that is either a permanently flowing stream or one that may stop flowing in dry weather but still maintains large pools of water that support aquatic life. Unclassified streams are small tributaries to classified streams. They typically have flowing water only during wet weather and are dry for the remainder of the year.

Water Quality in Prairie Streams
http://www.dnr.mo.gov/env/wpp/watersheds/info/wq-prairie-str.pdf

Aquatic Habitat in Prairie Streams
http://www.dnr.mo.gov/env/wpp/watersheds/info/aquatic-hab-prairie-str.pdf

Point Source Pollution

Point source pollution is a discharge of wastewater from a single location such as a wastewater treatment plant. Wastewater treatment plants can serve industries, small businesses, subdivisions, mobile home parks, apartment complexes, or entire cities. Wastewater from residential sources such as subdivisions, apartments and mobile home parks is often referred to as "domestic wastewater." It contains primarily treated human wastes, food wastes and detergents. The primary pollutants of concern in domestic wastewater are the amount of organic matter, which is commonly reported as Biological Oxygen Demand (BOD), suspended solids, and ammonia. Industrial and commercial wastewater can be more complex and may contain, in addition to domestic wastes, heavy metals or man-made organic chemicals that can be potentially toxic. Discharges from most municipal wastewater treatment plants are usually a mixture of domestic and industrial/commercial wastewater. Most wastewater plant discharges are also typically high in nitrogen and phosphorus, two elements that act as fertilizers and can cause excessive algae growth in waters receiving these discharges.

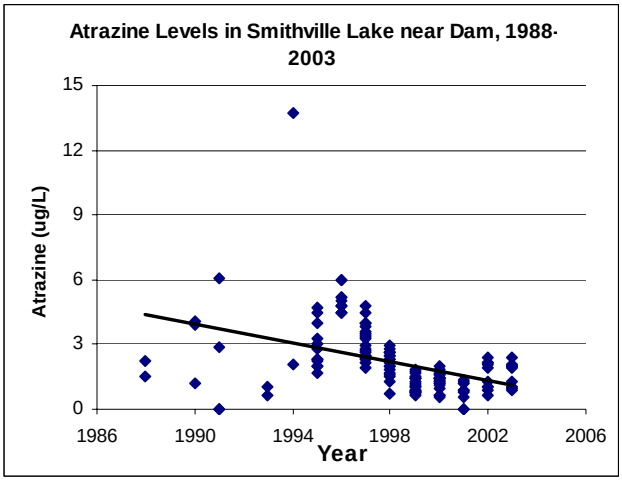
There are 32 permitted domestic or industrial/commercial point sources that discharge a combined 5.04 million gallons per day (mgd) of treated wastewater into the waters of the Platte River basin. The largest wastewater discharge in the basin is the 1.4mgd wastewater discharge from the Kansas City Todd Creek plant. There are 402 miles of classified streams in the basin, of which 5.8 miles (1.5 percent) are affected or impaired by point source discharges. Point source discharges are known to affect or impair 1.3 miles of unclassified streams in the basin. The Kansas City Todd Creek plant, the KC Rocky Branch plant and the King City wastewater plant are the only discharges known to affect more than 0.5 miles of receiving stream.

Wastewater Treatment
http://www.dnr.mo.gov/env/wpp/watersheds/info/wastewater-treatment.pdf

Nonpoint Source Pollution

Nonpoint source pollution occurs when pollutants enter bodies of water at points that are not well-defined and stable. Examples include the erosion of sediments or the entrance of polluted surface runoff or groundwater into lakes and streams. Locations of nonpoint source pollution are often widely dispersed and are difficult to identify or control. In the Platte River basin, the most serious nonpoint problem is degradation of aquatic habitat. A total of 402 miles (100 percent) of classified streams in the basin are considered to have degraded aquatic habitat. The lack of infiltration of rainfall, when combined with local soil tillage and other land uses, leads to a large amount of surface runoff during wet weather. This contributes to soil erosion and high levels of sediment deposition in streams. The quality of aquatic habitat is further impaired by removal of wooded riparian vegetation, and by the channelization, or straightening, of streams. Channelization has occurred in 74 miles (18 percent) of streams in the basin.

Storm water runoff in the Midwest can carry significant amounts of fertilizers, animal wastes, and pesticides into streams. Atrazine is an agricultural herbicide used on corn and grain sorghum that is commonly found in stormwater runoff. Missouri's water quality standards allow no more than 3.0 ug/l Atrazine in drinking water reservoirs as a long-term average. Smithville Lake serves as the source for public water supplies in Smithville and Plattsburg. King City uses the King City reservoir as a public drinking water supply sources. Nonpoint source watershed projects in the Smithville Lake watershed have focused on atrazine reduction. These projects have been successful in reducing levels of atrazine below the 3 ug/L standard.



Finished drinking water is monitored regularly at all public supplies in Missouri and has been found to meet state standards for pesticides. Levels of atrazine in finished drinking water supplies may be significantly lower than the amounts found in the reservoirs if the drinking water plants take measures to reduce atrazine during the water treatment process.

Groundwater can also be affected by nonpoint source pollution. In northern and western Missouri, some public water supplies and many private water supplies come from groundwater. While public groundwater supplies are routinely tested and protected, many private wells are not. Studies of water quality of private wells in northern and western Missouri show that about one third of wells exceed the drinking water standard for nitrate. About 2 percent exceed drinking water standards for pesticides. This contamination is often caused by local land use practices or surface contamination of the wellhead and does not represent widespread contamination of the underground aquifer. Deeper aquifers are protected from surface contamination by impermeable strata.

During warm weather when stream flows are low, livestock tend to gather in and around streams. The wastes they leave in the water contributes to nuisance algae growths, low levels of dissolved oxygen and elevated levels of ammonia and bacteria.

Water Quality Management

The department achieves water quality management of point source pollutants through the issuance and enforcement of wastewater discharge permits. These permits limit the amount of pollutants that can be discharged. All point source wastewater dischargers must obtain a permit and adhere to its discharge limitations. All permits require at least a level of treatment equal to national wastewater treatment standards. In situations where these national treatment standards are not adequate to protect the streams or lakes receiving these wastewater discharges, stricter permit limits that do protect these waters are required. The permits require regular monitoring and reporting of discharge quality.

The department also conducts regular inspection of wastewater treatment facilities and receiving waters.

Nonpoint source pollution is addressed through the state's nonpoint source management plan. This plan is a cooperative program between the Department of Natural Resources and other federal, state and local government agencies or organizations, local landowners and other interested citizens. The plan emphasizes addressing problems at the watershed level through the use of management practices that control nonpoint pollution. The most commonly supported practices are those that control soil erosion on agricultural and urban lands, improve quality and quantity of forage on grazing lands, protect riparian zones, and those that control runoff of animal manures, fertilizers and pesticides. The state nonpoint source management plan is a voluntary program that provides funds to help defray the cost of adopting management practices.

Since 1990, two nonpoint source watershed project has been initiated in the basin. This project is funded by state sales tax money earmarked for soil and water conservation.

Table 3. Nonpoint Source Watershed Projects in the Platte River Basin

Watershed Name	County	Project Date	Watershed Size (Acres)	Acres Treated	Percent of Watershed Treated
Third Fork	DeKalb	1994-99		10,174	
Little Third Fork	DeKalb	2004 -10			

The Missouri Department of Natural Resources monitors water chemistry and aquatic invertebrate communities at many locations in Missouri. The department also tracks the quality of domestic, industrial and storm water discharges. These monitoring activities provide information on water quality problems, such as their specific location, pollutants, sources and possible solutions. This information guides the management activities the department takes to protect water quality in Missouri.

Web links

Water Quality Data is available via the US Geological Survey National Water Quality Information System
http://waterdata.usgs.gov/mo/nwis/qwdata